PTO/SB/21 (09-04)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission	43

Application Number	10/735,369
Filing Date	December 12, 2003
First Named Inventor	ACKERMAN et al.
Art Unit	1762
Examiner Name	BAREFORD, Katherine A.
Attorney Docket Number	130014/11922 (21635-0117-01)

ENCLOSURES ***(check all that apply)***

- ☒ Fee Transmittal Form
- ☐ Fee Attached
- ☐ Amendment / Reply
- ☐ After Final
- ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
- ☐ Reply to Missing Parts under 37 CFR1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☒ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) *(please identify below)*:

Return Receipt Postcard; Certificate of Mailing; Appeal Brief (39 pages)

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm	McNees Wallace & Nurick LLC		
Signature	# 50,311		
Printed Name	Shawn K. Leppo		
Date	November 28, 2005	Reg. No.	50,311

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Signature	Holly J. Lawrence		
Typed or printed name	Holly J. Lawrence	Date	November 28, 2005

PTO/SB/17 (10-04)
Approved for use through 07/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500

Complete if Known	
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METHOD OF PAYMENT *(check all that apply)*

☐ Check ☐ Credit card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number: 50-1059

Deposit Account Name: McNees Wallace & Nurick LLC

The Director is authorized to: *(check all that apply)*
☒ Charge fee(s) indicated below ☒ Credit any overpayments
☐ Charge any additional fee(s) during the pendency of this application
☐ Charge fee(s) indicated below, **except for the filing fee** to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) ($) 0

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

			Extra Claims		Fee from below		Fee Paid
Total Claims		- ** =	0	X		=	0
Independent Claims		- ** =	0	X		=	0
Multiple Dependent				X		=	0

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
1202	18	2202	9	Claims in excess of 20
1201	88	2201	44	Independent claims in excess of 3
1203	300	2203	150	Multiple dependent claim, if not paid
1204	88	2204	44	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 0

**or number previously paid, if greater; For Reissues, see above*

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	2401	170	Notice of Appeal	
1402	340	2402	170	Filing a brief in support of an appeal	500.00
1403	300	2403	150	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive – unavoidable	
1453	1,330	2453	665	Petition to revive – unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17 (q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	
				Other fee (specify) ____	

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 500

SUBMITTED BY				Complete *(if applicable)*	
Name (Print/Type)	Shawn K. Leppo	*Registration No. (Attorney/Agent)*	50,311	*Telephone*	(717) 232-8000
Signature				*Date*	November 28, 2005

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	)	
John F. Ackerman et al.	)	GAU: 1762
Ser. No. 10/735,369	)	Examiner:
Filed: December 12, 2003	)	Bareford

For: ARTICLE PROTECTED BY A THERMAL BARRIER COATING HAVING A GROUP 2 OR 3/GROUP 5 STABILIZATION-COMPOSITION-ENRICHED SURFACE

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant files its Appeal Brief, together with a Fee Transmittal and authorizing payment of the fee. A Notice of Appeal and fee were previously filed.

Real Party in Interest

The real party in interest is the General Electric Co.

Related Appeals and Interferences

Applicant is not aware of any related appeals or interferences.

Status of claims

Claims 1-20 were filed. The claims were not amended during prosecution.

Claims 1-20 were finally rejected in a Final Office Action mailed June 28, 2005 (hereinafter "Final Office Action"). Claims 1-20 are appealed.

A copy of appealed claims 1-20 is in Appendix I.

Status of amendments

A Response to Final Office Action was filed, but it had no claim amendments.

Summary of claimed subject matter

With respect to independent claim 1, the flow chart of Figure 1 describes a method for preparing a protected article as there recited. Figure 2 illustrates one such article 40 and component, a gas turbine blade 42. The gas turbine blade has an airfoil 44 against which a flow of hot combustion gas impinges during service operation. (pg. 5, line 9 – pg. 6, line 14). Figure 3 is an enlarged sectional view of a surface region of the airfoil 44 of the article 40, showing the recited physical features. The article 40 is provided, step 20 of Figure 1. A bond coat 60 is deposited on an exposed surface 62 of the article 40. The bond coat 60 provides oxidation and corrosion protection, and also facilitates the adhesion of the overlying layer to the article 40.

A thermal barrier coating 64 is produced on an exposed surface 66 of the bond coat 60, step 24 of Figure 1. This step 24 of producing the thermal barrier coating 64 includes the steps of depositing a primary ceramic coating 68 onto an exposed surface 66 of the bond coat 60, step 26 of Figure 1. The primary ceramic coating 68 is deposited as columnar grains 70 with gaps 74 therebetween. This morphology is highly beneficial to the performance of the thermal barrier coating 64. However, with extended time in the elevated-temperature service environment, the gaps 74 tend to close, so that the beneficial columnar grain/gap morphology is lost (pg. 8, line 19 to pg. 9, line 14).

To retain the desired structure and prevent the closure of the gaps 74, a stabilization composition 78 is deposited onto an exposed surface 72 of the primary ceramic coating 68 prior to service, step 28 of Figure 1. Figure 4 is an enlarged detail of Figure 3, illustrating the columnar grains 70, the gaps 74, and the stabilization composition 78. The stabilization composition 78 inhibits sintering and thereby slows or prevents the closure of the gaps

between the columnar grains, so that the desirable columnar grain/gap morphology is retained.

The stabilization composition 78 has a defined composition. The stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. The atomic ratio of the amount of the first element to the amount of the second element must be at least 1:3. Page 9, line 19 to pg.10, line 6 describes the composition and the reasons for its selection.

Independent claim 12 is similar to claim 1 as to the recited steps and that prior discussion is incorporated here. Claim 12, specifically recites that the article 40 is a nickel-base superalloy article that is a component of a gas turbine engine such as a gas turbine blade 42. See pg. 5, lines 22-25 and Figure 2. The primary ceramic coating 68 is yttria-stabilized zirconia (pg. 8, lines 5 - 15). The stabilization composition 78 is deposited by infiltration (pg. 9, line 19 –22).

Independent claim 20 includes the same steps of providing the article 40, depositing the bond coat 60, and providing the primary ceramic coating 68 as claim 1, and the prior discussion is incorporated here. Claim 20 then recites the production of a sintering-inhibitor region at a surface of the primary ceramic coating 68. The sintering-inhibitor region comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table, and wherein the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3.

Grounds of rejection to be reviewed on appeal

Ground 1. Claims 1, 2, 5-12, and 15-20 are rejected under the doctrine of obviousness-type double patenting over claims 14-18 of U.S. Patent 6,887,588.

Ground 2. Claims 1-20 are rejected under 35 USC 103 as unpatentable over Ackerman U.S. 2003/0059633.

Ground 3. Claims 1-12 and 14-20 are rejected under 35 USC 103 over Subramanian U.S. Patent 6,677,064.

Ground 4. Claim 13 is rejected under 35 USC 103 over Subramanian '064 in view of Taylor U.S. Patent 5,520,516.

Argument

Ground 1. Claims 1, 2, 5-12, and 15-20 are rejected under the doctrine of obviousness-type double patenting over claims 14-18 of US Patent 6,887,588.

Claims 1, 6, 7

To sustain the double patenting rejection, the relied-upon claims of the '588 patent must teach the limitations of the rejected claims. In this case, they do not.

Claim 1 recites in part:

> "the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

Claim 1 includes a limitation that a first element must be selected from Group 2 or Group 3 of the periodic table, and a second element must be selected from Group 5 of the periodic table, in the stabilization composition or the sintering-inhibitor region. Claims 14-18 of the '588 patent have no such teaching.

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that (1) of the listed inhibitor material, one of group 2 or 3 of the periodic table and one of group 5 of the periodic table are selected..." (Final Office Action, page 3, lines 16-18). A teaching of the selection of one or more of a list of elements is not the same as a teaching that a first element must be selected from one subgroup and a second element must be selected from a second subgroup.

Claim 1 also recites in part:

> "the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3."

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that...(3) the ratios of the inhibitor elements." (Final Office Action, page 3, lines 16-20).

The explanation of the rejection relies on "routine experimentation." "Routine experimentation" has become a fashionable attempted basis for rejections when the prior

art has absolutely no teaching of a claim limitation. However, the case authority and the MPEP have placed tight limits on the ability to create non-existent teachings by this route. As noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." This mandate, which is supported in the cited MPEP section by citations to the case authority, means that the prior art must first recognize that a particular parameter should be optimized before its optimization is a matter of routine experimentation. If the nature of the invention includes first recognizing that a particular parameter may be optimized to achieve desirable results in the claimed subject matter, then the subsequent optimization cannot be a matter of routine.

In this case, the parameter in question is "the atomic ratio of the amount of the first element to the amount of the second element." It will be recalled that the first element is selected from Group 2/Group 3 of the periodic table, and the second element is selected from Group 5 of the periodic table. Nothing in claims 14-18 of the '588 patent suggests that these pairings have significance, and specifically do not suggest anything about the ratios of the first element and the second element. Accordingly, the optimization of "the atomic ratio of the amount of the first element to the amount of the second element" cannot be a matter of routine.

Claim 2

Claim 2 incorporates the limitations of claim 1 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 1, which are incorporated here.

Additionally, claim 2 recites in part:

"providing the article as a nickel-base superalloy article."

Claims 14-18 have no such teaching.

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that...(2)...the substrate nickel-base superalloy" (Final Office Action, page 3, lines 16-19).

The explanation of the rejection relies on "well known" prior art (last two lines of page 3 and first two lines of page 4 of the Final Office Action). Applicant timely traversed this attempt to rely on "well known" prior art and asked for the citation of a prior art reference, as provided in MPEP 2144.03. There was no response.

Claim 5

Claim 5 incorporates the limitations of claim 1 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 1, which are incorporated here.

Claim 5 further recites in part:

"depositing yttria-stabilized zirconia as the primary ceramic coating."

Claims 14-18 have no such teaching.

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that...(2) that the thermal barrier material is a ceramic such as yttria stabilized zirconia..." (Final Office Action, page 3, lines 16-19).

The explanation of the rejection relies on "well known" prior art (last two lines of page 3 and first two lines of page 4 of the Final Office Action). Applicant timely traversed this attempt to rely on "well known" prior art and asked for the citation of a prior art reference, as provided in MPEP 2144.03. There was no response.

Claim 8

Claim 8 incorporates the limitations of claim 1 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 1, which are incorporated here.

Claim 8 also recites in part:

"depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

That is, claim 8 recites some specific elemental pairs that can be used in the stabilization composition. The "588 patent has no such teaching of these pairs. The explanation of the rejection relies on "routine experimentation." However, there is nothing in claims 14-18 suggesting that a pairing from Groups 2/3 and Group 5 of the periodic table would be beneficial, pointing the way toward experimentation in that direction.

Claims 9, 10

Claims 9 and 10 incorporate the limitations of claim 1 and are allowable for the reasons stated in relation to claim 1, which are incorporated here.

Each of claims 9 and 10 also recite in part:

"co-depositing the first element and the second element".

Nothing in claims 14-18 even deal with the approach for depositing sintering inhibitors, much less teaching the recited co-deposition.

Claim 11

Claim 11 incorporates the limitations of claim 1 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 1, which are incorporated here.

Claim 11 also recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1."

Claims 14-18 have no such teaching.

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that...(3) the ratios of the inhibitor elements." (Final Office Action, page 3, lines 16-20).

The explanation of the rejection relies on "routine experimentation." However, there is nothing in claims 14-18 suggesting that adjusting the ratios of elements would have any beneficial effect, pointing the way toward experimentation in that direction. The discussion of this point in relation to the rejection of claim 1 is incorporated here by reference.

Claims 12, 15-16

Claim 12 recites in part:

"...the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table...".

Claim 12 further recites in part:

"...the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3."

These same limitations are found in claim 1, and the prior discussion of claim 1 is incorporated here.

Claim 12 further recites in part:

"a nickel-base superalloy article"

This same limitation is found in claim 2, and the prior discussion of claim 2 is incorporated here.

Claim 12 further recites in part:

"depositing a yttria-stabilized zirconia primary ceramic coating"

A similar limitation is found in claim 5, and the prior discussion of claim 5 is incorporated here.

None of these limitations is taught by the prior art.

Claim 17

Claim 17 incorporates the limitations of claim 12 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 12, which are incorporated here.

Claim 17 also recites in part:

"depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

That is, claim 17 recites some specific elemental pairs that can be used in the stabilization composition. The '588 patent has no such teaching of these pairs. The explanation of the rejection relies on "routine experimentation." However, there is nothing in

claims 14-18 suggesting that a pairing from Groups 2/3 and Group 5 of the periodic table would be beneficial, pointing the way toward experimentation in that direction.

Claim 18

Claim 18 incorporates the limitations of claim 12 and are allowable for the reasons stated in relation to claim 12, which are incorporated here.

Claim 18 also recites in part:

"co-depositing the first element and the second element."

Nothing in claims 14-18 even deal with the approach for depositing sintering inhibitors, much less teaching the recited co-deposition.

Claim 19

Claim 19 incorporates the limitations of claim 12 and is not taught by claims 14-18 of the '588 reference for the reasons stated in relation to claim 12, which are incorporated here.

Claim 19 also recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1."

Claims 14-18 have no such teaching.

The explanation of the rejection admits, "...'588 teaches all the features of these claims except that...(3) the ratios of the inhibitor elements." (Final Office Action, page 3, lines 16-20).

The explanation of the rejection relies on "routine experimentation." However, there is nothing in claims 14-18 suggesting that adjusting the ratios of elements would have any beneficial effect, pointing the way toward experimentation in that direction. See the discussion of this point in relation to the rejection of claim 1, which is incorporated here.

Claim 20

Claim 20 recites in part:

"the sintering-inhibitor region comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

Claim 20 further recites in part:

"the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

Similar recitations are found in claims 1 and 12, and the prior discussion of claims 1 and 12 is incorporated here.

Ground 2. Claims 1-20 are rejected under 35 USC 103 as unpatentable over Ackerman U.S. 2003/0059633.

The following principle of law applies to all sec. 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the single applied prior art reference clearly does not arguably teach some limitations of the claims.

Claims 1-5

Claim 1 recites in part:

> "the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above, MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '633 publication, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes a new standard of obviousness: "can be", as in "The first element can be from Group 2 or 3...The second element can be from Group 5" (Final Office Action, page 8, lines 16-18). (The Board will note that virtually all of the arguments of the explanations of the rejections as to what is asserted to be obvious under sec. 103 in Grounds 1, 2, and 3 are expressed in terms of the proposed but erroneous "can be" standard.) The explanation of the rejection thus asserts that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" created by a patent examiner who has access to the pending application. The explanation of the rejection thus seeks to apply an incorrect legal standard to support its rejection. The correct standard is that the prior art must teach the limitations of the claims, see the quote from MPEP 2143.03 in the prior paragraph. There is no mention in the MPEP or the case authority of the proposed "can be" standard.

In fact, the '633 publication never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. In paragraphs [0032]-[0034], referenced by the explanation of the rejection, there is disclosure of a number of elements that are in Groups 2, 3, or 5, but no disclosure or teaching of using combinations of specific elements, one from Group 2 or Group 3, and the other from Group 5. None of the examples cited by the '633 publication make any such suggestion.

The explanation of the rejection asserts that it would be obvious from the '633 publication to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, under the proposed "can be" standard the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element a Group 2 element. Or many other combinations can be tried. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. But none of the combinations are

"taught" by the reference. With the advantage of hindsight using the present disclosure, a patent examiner always "can" make the right decisions about which elements "can be" selected and how they "can be" ordered. However, the proposed "can be" standard is directly contrary to the law governing sec. 103 rejections, which requires that the prior art reference teach the claim limitation.

Claim 1 further recites in part:

> "the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '633 publication, "Ackerman teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 7, lines 17-18.)

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon. But under this proposed "can be" standard, other combinations are equally good combinations and equally good candidates as already discussed above.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '633 publication or any other reason.

Third, there is no indication in the '633 publication that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Claim 6

Claim 6 incorporates the limitations of claim 1. Claim 6 is patentable over the '633 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 6 recites in part:

> "providing the first element selected from the group consisting of lanthanum, neodymium, and cerium"

The '633 publication has no such teaching. Using the Examiner's "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated elements.

Claim 7

Claim 7 incorporates the limitations of claim 1. Claim 7 is patentable over the '633 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 7 recites in part:

> "providing the second element selected from the group consisting of tantalum and niobium."

The '633 publication has no such teaching. Using the Examiner's "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated elements.

Claim 8

Claim 8 incorporates the limitations of claim 1. Claim 8 is patentable over the '633 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 8 recites in part:

> "depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

The '633 publication has no such teaching. Using the Examiner's "can be" standard, it is equally true that the elemental pairings can be lanthanum and niobium, barium and strontium, barium and tantalum, barium and lanthanum, barium and neodymium, gadolinium and niobium, and any others of hundreds of combinations.

Claims 9 and 10

Each of claims 9 and 10 incorporates the limitations of claim 1. Each of these claims is patentable over the '633 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Each of claims 9 and 10 also recites in part:

> "co-depositing the first element and the second element"

The '633 publication has no such teaching. The explanation of the rejection references para. [0036] of the '633 publication as teaching this limitation, but while this paragraph speaks of supplying elements in a liquid form, it does not specifically teach that multiple elements may be supplied in a single liquid.

Claim 11

Claim 11 incorporates the limitations of claim 1. Claim 11 is patentable over the '633 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Claim 11 further recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1."

The '633 publication has no such teaching. See the discussion of the "1:3" limitation in relation to claim 1, which discussion is incorporated here. There is no teaching in the '633 publication that an atomic ratio of 1:1 has any particular significance.

Claim 12-14

Claim 12 recites in part:

"the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above," To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '633 publication, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes a new standard of obviousness: "can be". The explanation of the rejection argues that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" developed. In fact, the '633 publication never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table.

The explanation of the rejection asserts that it would be obvious from the '633 publication to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, according to the "can be" standard the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element can be a Group 2 element. Or other combinations of elements can be tried. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. With the

advantage of hindsight, one can always make the right decisions about which elements should be selected and how they should be ordered.

Claim 12 further recites in part:

> "the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '633 publication, "Ackerman teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 7, lines 17-18.)

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '633 publication or any other reason.

Third, there is no indication in the '633 publication that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Claim 15

Claim 15 incorporates the limitations of claim 12. Claim 15 is patentable over the '633 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 15 recites in part:

> "providing the first element selected from the group consisting of lanthanum, neodymium, and cerium"

The '633 publication has no such teaching. Using the Examiner's "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 16

Claim 16 incorporates the limitations of claim 12. Claim 16 is patentable over the '633 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 16 recites in part:

> "providing the second element selected from the group consisting of tantalum and niobium."

The '633 publication has no such teaching. Using the erroneous "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 17

Claim 17 incorporates the limitations of claim 12. Claim 17 is patentable over the '633 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 17 recites in part:

"depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

The '633 publication has no such teaching. Using the erroneous "can be" standard, it is equally true that the elemental pairings can be lanthanum and niobium, barium and strontium, barium and tantalum, barium and lanthanum, barium and neodymium, gadolinium and niobium, and any others of hundreds of combinations.

Claim 18

Claim 18 incorporates the limitations of claim 12. Each of these claims is patentable over the '633 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Claim 18 also recites in part:

"co-depositing the first element and the second element"

The '633 publication has no such teaching. The explanation of the rejection references para. [0036] of the '633 publication as teaching this limitation, but it simply isn't there. This paragraph speaks of supplying elements in a liquid form, but does not specifically teach that multiple elements be supplied in a single liquid.

Claim 19

Claim 19 incorporates the limitations of claim 12. Claim 19 is patentable over the '633 reference for the reasons discussed above in relation to claim 19, which are incorporated here.

Claim 19 further recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1."

The '633 publication has no such teaching. See the discussion of the "1:3" limitation in relation to claim 1, which discussion is incorporated here. There is no teaching in the '633 publication that an atomic ratio of 1:1 has any particular significance.

Claim 20

Claim 20 recites in part:

> "the sintering-inhibitor region comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above, "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '633 publication, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes its new legal standard of obviousness: "can be", to replace the MPEP's "must teach" standard. The explanation of the rejection argues that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" developed. In fact, the '633 publication never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. In paragraphs [0032]-[0034], referenced by the explanation of the rejection, there is disclosure of a number of elements that are in Groups 2, 3, or 5, but no disclosure or teaching of using combinations of specific elements, one from Group 2 or Group 3, and the other from Group 5. None of the examples cited by the '633 publication make any such suggestion.

The explanation of the rejection asserts that it would be obvious from the '633 publication to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, under the "can be" standard the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element can be a Group 2 element. Or many other combinations can be proposed. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. With the advantage of hindsight and having the present disclosure, one can always make the right decisions about which elements should be selected and how they should be ordered.

Claim 20 further recites in part:

"the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '633 publication, "Ackerman teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 7, lines 17-18.)

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as provided by MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon. But under this proposed "can be" standard, other combinations are equally good combinations and equally good candidates.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '633 publication or any other reason.

Third, there is no indication in the '633 publication that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Ground 3. Claims 1-12 and 14-20 are rejected under 35 USC 103 over Subramanian U.S. Patent 6,677,064.

Claims 1-5

Claim 1 recites in part:

> "the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above, "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '064 patent, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes a new standard of obviousness: "can be". The explanation of the rejection argues that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" developed. In fact, the '064 patent never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. At col. 5, lines 50-66, referenced in the explanation of the rejection, there is disclosure of a number of elements that are in Groups 2, 3, or 5, but no disclosure or teaching of using combinations of specific elements, one from Group 2 or Group 3, and the other from Group 5. None of the examples cited by the '064 patent make any such suggestion.

The explanation of the rejection asserts that it would be obvious from the '064 patent to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, under the "can be" standard the first element can be a Group 2 or Group 5 element, and the second element a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element a Group 2 element. Or many other combinations can be tried. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. With the advantage of hindsight, one can always make the right decisions about which elements should be selected and how they should be ordered.

Claim 1 further recites in part:

> "the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '064 patent, "Subramanian teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 9, last two lines on the page).

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon. But under this proposed "can be" standard, other combinations are equally good combinations and equally good candidates. Thus, for example, the first element can be a Group 5 element, and the second element can be a Group 2 or Group 3 element. Or the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element can be a Group 2 element. Or other combinations of elements that are not within the scope of the rejected claims can be tried. With the advantage of hindsight and possessing the present disclosure, a patent examiner can always make the right decisions.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '064 patent or any other reason.

Third, there is no indication in the '064 patent that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Claim 6

Claim 6 incorporates the limitations of claim 1. Claim 6 is patentable over the '064 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 6 recites in part:

"providing the first element selected from the group consisting of lanthanum, neodymium, and cerium"

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 7

Claim 7 incorporates the limitations of claim 1. Claim 7 is patentable over the '064 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 7 recites in part:

"providing the second element selected from the group consisting of tantalum and niobium."

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 8

Claim 8 incorporates the limitations of claim 1. Claim 8 is patentable over the '064 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Additionally, claim 8 recites in part:

"depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the elemental pairings can be lanthanum and niobium, barium and strontium, barium and tantalum, barium and lanthanum, barium and neodymium, gadolinium and niobium, and any others of hundreds of combinations.

Claims 9 and 10

Each of claims 9 and 10 incorporates the limitations of claim 1. Each of these claims is patentable over the '064 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Each of claims 9 and 10 also recites in part:

"co-depositing the first element and the second element"

The '064 patent has no such teaching. The explanation of the rejection references col. 5, lines 40-50 of the '064 patent as teaching this limitation, but it simply isn't there. This paragraph speaks of supplying elements in a liquid form, but does not teach that multiple elements be supplied in a single liquid.

Claim 11

Claim 11 incorporates the limitations of claim 1. Claim 11 is patentable over the '064 reference for the reasons discussed above in relation to claim 1, which are incorporated here.

Claim 11 further recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1."

The '064 patent has no such teaching. See the discussion of the "1:3" limitation in relation to claim 1, which discussion is incorporated here.

Claim 12, 14

Claim 12 recites in part:

> "the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above, "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '064 patent, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes a new standard of obviousness: "can be". The explanation of the rejection argues that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" developed. In fact, the '064 patent never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. At col. 5, lines 50-66, referenced by the explanation of the rejection, there is disclosure of a number of elements that are in Groups 2, 3, or 5, but no disclosure or teaching of using combinations of specific elements, one from Group 2 or Group 3, and the other from Group 5. None of the examples cited by the '064 patent make any such suggestion.

The explanation of the rejection asserts that it would be obvious from the '064 patent to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, according to the "can be" standard the first element can be a Group 2 or Group 5 element, and the second element a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element a Group 2 element. Or why could other combinations of elements not be tried. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. With the advantage of hindsight, one can always make the right decisions about which elements should be selected and how they should be ordered.

Claim 12 further recites in part:

"the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '064 patent, "Subramanian teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 9, last two lines on the page.)

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon. But under this proposed "can be" standard, other combinations are equally good combinations and equally good candidates. Thus, for example, the first element can be a Group 5 element, and the second element can be a Group 2 or Group 3 element. Or the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element can be a Group 2 element. Or other combinations of elements that are not within the scope of the rejected claims can be proposed. With the advantage of hindsight and possessing the present disclosure, a patent examiner can always make the right decisions.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '064 patent or any other reason.

Third, there is no indication in the '064 patent that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Claim 15

Claim 15 incorporates the limitations of claim 12. Claim 15 is patentable over the '064 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 15 recites in part:

> "providing the first element selected from the group consisting of lanthanum, neodymium, and cerium"

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 16

Claim 16 incorporates the limitations of claim 12. Claim 16 is patentable over the '064 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 16 recites in part:

> "providing the second element selected from the group consisting of tantalum and niobium".

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the second element can be selected from the group consisting of lanthanum, neodymium, and cerium; or that the first element can be selected from the group consisting of tantalum and niobium; or any other group of associated element.

Claim 17

Claim 17 incorporates the limitations of claim 12. Claim 17 is patentable over the '064 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Additionally, claim 17 recites in part:

> "depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum."

The '064 patent has no such teaching. Using the "can be" standard, it is equally true that the elemental pairings can be lanthanum and niobium, barium and strontium, barium and tantalum, barium and lanthanum, barium and neodymium, gadolinium and niobium, and any others of hundreds of combinations.

Claim 18

Claim 18 incorporates the limitations of claim 12. Each of these claims is patentable over the '064 reference for the reasons discussed above in relation to claim 12, which are incorporated here.

Claim 18 also recites in part:

> "co-depositing the first element and the second element"

The '064 patent has no such teaching. The explanation of the rejection references col. 5, lines 42-48 of the '064 patent as teaching this limitation, but this paragraph speaks of supplying elements in a sol gel form. It does not specifically teach that multiple elements be supplied in a single sol gel.

Claim 19

Claim 19 incorporates the limitations of claim 12. Claim 19 is patentable over the '064 reference for the reasons discussed above in relation to claim 19, which are incorporated here.

Claim 19 further recites in part:

"depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1".

The '064 patent has no such teaching. See the discussion of the "1:3" limitation in relation to claim 1, which discussion is incorporated here. There is no teaching in the '064 patent that an atomic ratio of 1:1 has any particular significance.

Claim 20

Claim 20 recites in part:

"the sintering-inhibitor region comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table."

As quoted above, "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." There is no such teaching in the '064 patent, and the explanation of the rejection never suggests that there is.

Instead, the explanation of the rejection effectively proposes a new standard of obviousness: "can be". The explanation of the rejection argues that a hindsight reconstruction of a method consistent with the quoted claim limitation "can be" developed. In fact, the '064 patent never teaches that the stabilization composition includes a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table. At col. 5, lines 50-66, referenced by the explanation of the rejection, there is disclosure of a number of elements that are in Groups 2, 3, or 5, but no disclosure or teaching of using combinations of specific elements, one from Group 2 or Group 3, and the other from Group 5. None of the examples cited by the '064 patent make any such suggestion.

The explanation of the rejection asserts that it would be obvious from the '064 patent to select elements in particular combinations to meet the present claim limitations. But in fact there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Thus, for example, under the "can be" standard the first element can be a Group 2 or Group 5 element, and the second element a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the

second element a Group 2 element. Or many other combinations can be tried. Any of these other combinations would be consistent with the "can be" standard proposed in the explanation of the rejection. With the advantage of hindsight, one can always make the right decisions about which elements should be selected and how they should be ordered.

Claim 20 further recites in part:

> "the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3"

The explanation of the rejection admits that there is no teaching of the atomic ratio of the amounts of the elements in the '064 patent, "Subramanian teaches all of the features of these claims except the atomic ratio of the amount of the first element to the second element." (Final Office Action, page 9, last two lines on the page.)

The explanation of the rejection then relies on the assertion that it would be obvious to "...perform routine experimentation to optimize the amount of each element when using the mixture of materials..." As discussed earlier and as noted in MPEP 2144.05 (II)(B), "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." The assertion of "routine experimentation" is not proper in this situation for four reasons:

First, there is no teaching that a first element must be a Group 2 or Group 3 element, and the second element must be a Group 5 element. Instead, the incorrect "can be" standard is proposed and relied upon. But under this proposed "can be" standard, other combinations are equally good combinations and equally good candidates. Thus, for example, the first element can be a Group 5 element, and the second element can be a Group 2 or Group 3 element. Or the first element can be a Group 2 or Group 5 element, and the second element can be a Group 3 element. Or the first element can be a Group 3 or Group 5 element, and the second element can be a Group 2 element. Or other combinations of elements that are not within the scope of the rejected claims can be proposed. With the advantage of hindsight and possessing the present disclosure, a patent examiner can always make the right decisions.

Second, there is no recognition in the reference that the ratio of first element (i.e., Group 2 or Group 3 element) to second element (i.e., Group 5 element) has any significance. Certainly there is no mention or teaching of such a ratio. There is no recognition that changing the ratio might lead to any improved results either with the properties mentioned by the '064 patent or any other reason.

Third, there is no indication in the '064 patent that if there is an atomic excess of the Group 5 second element, sintering is promoted, the opposite of the desirable sintering retardation that is achieved in the present approach (see para. [0035] of the present application).

Fourth, there is no teaching that the recited ratio, 1:3, would yield any advantageous results.

Ground 4. Claim 13 is rejected under 35 USC 103 over Subramanian '064 in view of Taylor U.S. Patent 5,520,516.

Claim 13 depends from claim 12 and incorporates its limitation. The limitations of claim 12 are not taught by Subramanian '064 for the reasons stated above in relation to claim 12, which are incorporated here, and Taylor '516 adds nothing in this regard.

The present rejection is a sec. 103 combination rejection. It is well established that a proper sec. 103 combination rejection requires more than just finding teachings in the references of the elements recited in the claim (but which was not done here). To reach a proper teaching of an article or process through a combination of references, there must be stated an objective motivation to combine the teachings of the references, not a hindsight rationalization in light of the disclosure of the specification being examined. MPEP 2143 and 2143.01. See also, for example, In re Fine, 5 USPQ2d 1596, 1598 (at headnote 1) (Fed.Cir. 1988), In re Laskowski, 10 USPQ2d 1397, 1398 (Fed.Cir. 1989), W.L. Gore & Associates v. Garlock, Inc., 220 USPQ 303, 311-313 (Fed. Cir., 1983), and Ex parte Levengood, 28 USPQ2d 1300 (Board of Appeals and Interferences, 1993); Ex parte Chicago Rawhide Manufacturing Co., 223 USPQ 351 (Board of Appeals 1984). As stated in In re Fine at 5 USPQ2d 1598:

> "The PTO has the burden under section 103 to establish a prima facie case of obviousness. [citation omitted] It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references."

And, at 5 USPQ2d 1600:

> "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

Following this authority, the MPEP states that the examiner must provide such an objective basis for combining the teachings of the applied prior art. In constructing such rejections, MPEP 2143.01 provides specific instructions as to what must be shown in order to extract specific teachings from the individual references:

> "Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention when there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992)."
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> * * * * *
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> "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)."
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> * * * * *
>
> "A statement that modifications of the prior art to meet the claimed invention would have been 'well within the ordinary skill of the art at the time the claimed invention was made' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. Ex parte Levengood, 28 USPQ2d 1300 (Bd.Pat.App. & Inter. 1993)."

Here, there is set forth no objective basis for combining the teachings of the references in the manner used by this rejection, and selecting the helpful portions from each reference while ignoring the unhelpful portions. An objective basis is one set forth in the art or which can be established by a declaration, not one that can be developed in light of the present disclosure.

In the present case, the Subramanian '064 reference teaches that its coating is used with a nickel or cobalt base superalloy, see col. 4, lines 6-7. The Taylor '516 reference teaches that its coating is used with a titanium alloy, see col. 5, lines 40-53 or a nickel alloy, see col. 6, lines 63-64. These are two different classes of materials. There is no teaching in Taylor of using its approach on superalloys.

SUMMARY AND CONCLUSION

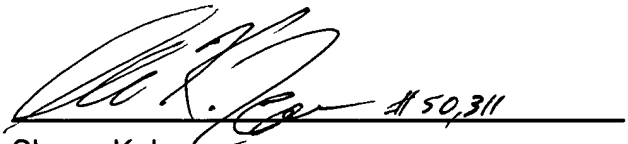
The presently claimed invention is based upon the discovery that particularly good performance may be obtained by depositing a stabilization composition "wherein the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table, and wherein the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3."

The references discuss some useful compositions, but in no case do they suggest the deposition of the stabilization composition selected from Group 2/Group 3 and Group 5 elements, in an atomic ratio of at least 1:3. The rejections are founded upon a misconception of the legal basis of a sec. 103 rejection as requiring that the limitations of the claims "can be" found in the prior art references.

When the correct "must teach" legal requirement of a sec. 103 rejection is applied, it is apparent that the prior art references do not teach the present claim limitations, and that the present claims are patentable over the prior art of record.

Respectfully submitted,

McNEES WALLACE & NURICK LLC



Dated: November 28, 2005

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APPENDIX I

Copy of Claims Involved in the Appeal

1. A method for preparing a protected article, comprising the steps of

providing the article;

depositing a bond coat onto an exposed surface of the article; and

producing a thermal barrier coating on an exposed surface of the bond coat, wherein the step of producing the thermal barrier coating includes the steps of

depositing a primary ceramic coating onto an exposed surface of the bond coat, and

depositing a stabilization composition onto an exposed surface of the primary ceramic coating, wherein the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table, and wherein the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3.

2. The method of claim 1, wherein the step of providing the article includes the step of

providing the article as a nickel-base superalloy article.

3. The method of claim 1, wherein step of providing the article includes the step of

providing the article in the form of a component of a gas turbine engine.

4. The method of claim 1, wherein the step of depositing the bond coat includes the step of

depositing a diffusion aluminide or an aluminum-containing overlay bond coat.

5. The method of claim 1, wherein the step of depositing the primary ceramic coating includes the step of

depositing yttria-stabilized zirconia as the primary ceramic coating.

6. The method of claim 1, wherein the step of depositing the stabilization composition includes the step of

providing the first element selected from the group consisting of lanthanum, neodymium, and cerium.

7. The method of claim 1, wherein the step of depositing the stabilization composition includes the step of

providing the second element selected from the group consisting of tantalum and niobium.

8. The method of claim 1, wherein the step of depositing the stabilization composition comprises the step of

depositing the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum.

9. The method of claim 1, wherein the step of depositing the stabilization composition includes the step of

co-depositing the first element and the second element.

10. The method of claim 1, wherein the step of depositing the stabilization composition includes the step of

co-depositing the first element and the second element from a liquid solution

11. The method of claim 1, wherein the step of depositing the stabilization composition includes the step of

depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1.

12. A method for preparing a protected article, comprising the steps of

providing a nickel-base superalloy article that is a component of a gas turbine engine;

depositing a bond coat onto an exposed surface of the article; and

producing a thermal barrier coating on an exposed surface of the bond coat, wherein the step of producing the thermal barrier coating includes the steps of

depositing a yttria-stabilized zirconia primary ceramic coating onto an exposed surface of the bond coat,

infiltrating a stabilization composition into an exposed surface of the primary ceramic coating, wherein the stabilization composition comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table, and wherein the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3.

13. The method of claim 12, wherein the step of depositing the primary ceramic coating includes the step of

depositing yttria-stabilized zirconia having about 7 percent yttria by weight.

14. The method of claim 12, wherein the step of depositing the bond coat includes the step of

depositing a diffusion aluminide or an aluminum-containing overlay bond coat.

15. The method of claim 12, wherein the step of infiltrating the stabilization composition includes the step of

providing the first element selected from the group consisting of lanthanum, neodymium, and cerium.

16. The method of claim 12, wherein the step of infiltrating the stabilization composition includes the step of

providing the second element selected from the group consisting of tantalum and niobium.

17. The method of claim 12, wherein the step of infiltrating the stabilization composition comprises the step of

deposition the stabilization composition selected from the group consisting of lanthanum and tantalum, neodymium and tantalum, lanthanum and niobium, neodymium and niobium, and cerium and tantalum.

18. The method of claim 12, wherein the step of infiltrating the stabilization composition includes the step of

co-depositing the first element and the second element.

19. The method of claim 12, wherein the step of depositing the stabilization composition includes the step of

depositing the stabilization compound such that the atomic ratio of the amount of the first element to the amount of the second element is at least 1:1.

20. A method for preparing a protected article, comprising the steps of

providing the article;

depositing a bond coat onto an exposed surface of the article; and

producing a thermal barrier coating on an exposed surface of the bond coat, wherein the thermal barrier coating comprises

a primary ceramic coating on the exposed surface of the bond coat, and

a sintering-inhibitor region at a surface of the primary ceramic coating, wherein the sintering-inhibitor region comprises a first element selected from Group 2 or Group 3 of the periodic table, and a second element selected from Group 5 of the periodic table, and wherein the atomic ratio of the amount of the first element to the amount of the second element is at least 1:3.

APPENDIX II

Evidence Entered and Relied Upon in the Appeal

None

APPENDIX III

Related Proceedings

None

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Application No.: 10/735,369
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